

Appln. No. 09/856,335
Amdt. dated September 29, 2003
Reply to Office action of March 28, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A process for producing a corrosion- and wear-resistant layer on a substrate by spraying on an iron oxide-based material, characterised in that the iron oxide-based material which has at least 20% by weight of magnetite (Fe_3O_4 and/or Fe_2O_3) is applied by on-line controlled ~~plasma~~ thermal spraying and in that the layer of the material is monitored by an on-line monitoring and control system, to produce a homogeneous and thin layer of $< 250 \mu\text{m}$ thickness.
2. (original) A process as set forth in claim 1 characterised by on-line monitoring and control by means of an ITG-camera (18) directed on to the spray jet (10), an LDA-detector (20) with LDA-laser (22) and an HSP-head (24) (Figure 1).
3. (previously amended) A process as set forth in claim 1 characterised by on-line monitoring and control by measurement of the particle speed in the spray flame.
4. (previously amended) A process as set forth in claim 1 characterised by on-line monitoring and control by means of measurement of the particle speed in the spray flame by a laser Doppler anemometer by means of a beam (60) which is emitted from a laser device (62) and which is divided into two partial beams (60_a, 60_b) by an optical transmission system (64) (Figure 6).

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5. (previously amended) A process as set forth in claim 1 characterised by on-line monitoring and control by measurement of the particle speed in the spray flame by means of a high-speed pyrometer.
6. (previously amended) A process as set forth in claim 1 characterised by on-line monitoring and control in which the particle temperature in the spray flame is measured by means of infra-red thermography (Figure 3).
7. (original) A process as set forth in claim 1 characterised by on-line monitoring and control in which the measured amount of gas is analysed.
8. (previously amended) A process as set forth in claim 1 characterised by on-line monitoring and control in which a measured amount of plasma gas is analysed.
9. (original) A process as set forth in claim 1 characterised by on-line monitoring and control in which a measured current-voltage characteristic is evaluated.
10. (currently amended) A process as set forth in claim 1 characterised by on-line monitoring and control in which an amount of powder which is fed to the a plasma spray flame is measured.
11. (cancelled)

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12. (previously amended) A process for producing a corrosion- and wear-resistant layer as set forth in claim 1 characterised in that an on-line controlled, water-stabilised plasma spray process is used as the coating process.

13. (cancelled)

14. (currently amended) A process as set forth in claim ~~13~~ 1 characterised in that the material comprises pure magnetite.

15. (currently amended) A process as set forth in claim ~~13~~ 1 characterised in that the material comprises magnetite and at least one further metallic material.

16. (currently amended) A process as set forth in claim ~~13~~ 1 characterised in that the material comprises magnetite and at least one intermetallic compound.

17. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by an addition of carbide or carbides or nitride or nitrides or silicide or silicides or boride or borides or oxide or oxides in the material.

18. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by the addition of a mixture of metals, intermetallic compounds, carbides, nitrides, silicides, borides and/or oxides in the material.

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19. (previously amended) A process as set forth in claim 15 characterised by magnetite and an addition of up to 50% by weight of Cr, CrNi or a ferritic steel in the material.

20. (currently amended) A process as set forth in claim ~~13~~ 1 characterised in that the material comprises magnetite and carbides of W, Cr, Mo, Nb, Ta, Ti or V.

21. (previously amended) A process as set forth in claim 20 characterised in that the material comprises magnetite with an addition of up to 30% by weight of tungsten and/or chromium carbides.

22. (cancelled)

23. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a mixture of magnetite and chromium oxide in the material with a proportion of the chromium oxide of between 1 and 40%.

24. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a grain size of said material to be sprayed of between 0.05 and 150 μm .

25. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a filling wire in the form of wire spray material whose filling comprises magnetite and whose sheath comprises an alloy.

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26. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a powder grain with good flow properties, which is produced from the powder material mixture by spray drying.

27. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a powder grain which is resistant to separation of its mixture and which is produced from the powder material mixture by means of an agglomeration process.

28. (currently amended) A process for producing a corrosion- and wear-resistant layer on a substrate ~~by thermal spraying~~ as set forth in claim 1 characterised in that said material to be sprayed has more than 30% by weight of magnetite (Fe_3O_4 and/or Fe_2O_4).

29. (previously presented) A process as set forth in claim 21 characterised by magnetite and an addition of up to 40% by weight of Cr, CrNi or a ferritic steel in the material.

30. (previously presented) A process as set forth in claim 20 characterised in that the material comprises magnetite with an addition of up to 20% by weight of tungsten and/or chromium carbides.

31. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a proportion of the chromium oxide of between 5 and 30% by weight.

32. (currently amended) A process as set forth in claim ~~13~~ 1 characterised by a grain size of said material to be sprayed of between 0.1 and 120 μm .

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33. (previously presented) The process as set forth in claim 1 wherein said spraying said iron oxide-based material comprises spraying said iron oxide-based material having more than 30% by weight of magnetite (Fe_3O_4 and/or Fe_2O_4).

34. (currently amended) The process of claim 1 wherein said spraying by on-line controlled ~~plasma~~ thermal spraying comprising a mode of spraying selected from the group consisting of high-speed flame spraying, plasma spraying, high powered plasma spraying (HPPS), shroud plasma spraying (SPS), on-line controlled wire-flame spraying, thermal spraying and arc wire spraying.

35. (currently amended) The process of claim 1 wherein said spraying by on-line controlled ~~plasma~~ thermal spraying comprises plasma spraying and said plasma spraying is performed in a mode selected from the group consisting of plasma spraying in air and plasma spraying in a vacuum.